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BUREAU OF SUGAR EXPERIMENT STATIONS

BRISBANE QUEENSLAND

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BUREAU OF SUGAR EXPERIMENT STATIONS
BRISBANE

THE
CANE GROWERS'
QUARTERLY BULLETIN

ISSUED BY DIRECTION OF THE
SUGAR EXPERIMENT STATIONS
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The Cane Growers' Quarterly Bulletin

VOL. XXV. OCTOBER 1, 1961 No. 2

EDITORIAL

Planning for the Future

Ever since the advent of mill peaks and farm peaks there has been a responsibility on the shoulders of the miller and the grower to give some thought to production targets. But it has been only in recent years, when export quotas have been more rigidly adhered to, that planning has been interpreted as practical restriction.

But, even though faced with strict controls, the industry had a simple planning problem. It was complicated only to the extent of planning for an average season when a bounteous or a sub-normal one may occur, or by the possibilities of shortfalls in other Commonwealth sugar countries.

Then came in rapid succession three major events which threw into our relative smooth sugar machinery a number of many-angled spanners.

The first was the departure of South Africa from the British Commonwealth and its establishment as an independent republic. This event raised doubts and speculation as to what would be the future of South Africa's participation in the British Commonwealth Sugar Agreement.

The Cuban situation and the American sugar quota position was the second event. Australia's success in obtaining an allocation on the American market—even though it is only for 1961*—has caused the industry to reconsider its planning in case later quotas may become available.*

And thirdly the negotiations between Great Britain and the European Economic Community have clouded the position in regard to the Commonwealth Sugar Agreement.

All in all, within a few short months, our simple, hardly-complicated position has changed to a complex one shrouded in doubts and possibilities. Let us look forward to speedy clarification.

What of Standover Canes?

BY N. McD. SMITH

The proposition of carrying forward crops into the next year is one which confronts many canegrowers and there is little doubt that unpredictable weather conditions and the uncertainties of production restrictions make this matter no easy problem.

It has always been considered desirable that to be suitable as a standover type a variety must conform to a certain pattern, *e.g.* it must be a shy or non-arrower, be able to withstand lodging and have an appreciable degree of resistance to stem diseases. However, earlier concepts that it should also be a thick-stalked type have nowadays been discarded as many modern medium to thin-stalked canes stand over very well.

Since the necessity to stand over cane is frequently dictated not by choice but by circumstance, the grower finds himself faced with the problem of trying to decide which of his fields could best be carried over. While several factors must be taken into consideration, as far as variety is concerned he will prudently select on the basis of maintaining freedom from stem rots and superior resistance to lodging and arrowing.

Because these factors are important the Bureau has in progress a series of standover trials. These are being conducted with any new canes showing an adaptability which allows them to produce good crops at one year as well as at two years of age. It is, of course, difficult to lay down a rigid rule regarding the particular standard to be attained. The ideal would be a cane which does not arrow, remains erect, is resistent to stem rots, has high sugar value at the beginning of the season, is comfortably handled by cutters, and ratoons strongly after

Fig. 27—The variety Q. 61 is a reasonably good standover cane but, as shown above, some lodging may occur.

photo N. McD. Smith.

harvest. This is a lot to ask of any variety but selective planting of potential standover canes continues in several trials in the Bundaberg district. Nor is the increasing importance of mechanical harvesting being overlooked, particularly in view of the current trend towards improvement in the handling of lodged crops by these machines.

Inter-Row Tractors

One of the greatest needs of the Sugar Industry since the mechanisation of cane farms has been a suitable inter-row tractor. Present high clearance tractors can not be effectively used in fields of uneven growth, and paddocks frequently have to be considered out of hand as soon as one portion of the field becomes too high to cultivate. The result is the growth of weeds and grass—particularly guinea grass—in these fields. In the days of horse cultivation such fields would have been adequately cultivated and the young grass controlled. To-day, on alluvial country and where gullies, depressions or wet patches exist, cultivation for weed control ceases much too early and, at harvest, the grower finds himself facing higher cutting costs or dirty cane penalties because of the weed and grass population.

In the past, inter-row tractors have not been popular with farmers. In the main, these tractors have been too wide, and have tended to break down cane in ratoon crops, particularly where rows have 4 feet 6 inches interspaces. Other complaints were that the tractors overheated or were too slow. In more recently designed types the width has been decreased and, with the attachment of suitable guards, no trouble is experienced. A four wheel drive articulated tractor has come on to the market and is much faster than the crawler type.

Prompted by the drive by mills for cleaner cane, and the advent of mechanical harvesting, growers are greatly concerned with the necessity of getting a clean burn at harvest. Some have turned to aerial spraying—to kill weeds and grasses—with varying results, while many are showing increasing interest in inter-row tractors, both for cultivation and for the application of weedicides. A survey of the Cairns district (Babinda and north) indicates that about 15 per cent of farmers have inter-row tractors—over 20 per cent of these being purchased in the last 12 months. Some growers have even gone to the extent of fabricating their own, using a second-hand baby car engine.

In the matter of successful chemical weed control the inter-row tractor can play a big part. Often, pre-emergence weedicides, when applied by high clearance tractors, have to be used too early in the growing season, and weed growth occurs after the weedicide breaks down. There are many new chemicals being put out as weedicides, some of which show considerable promise and these, used with an inter-row tractor, could go a long way to ensuring clean crops and the control of that bugbear of many growers—guinea grass.

G.B.

Modern Trends in Grub Control in the Burdekin District

BY R. W. MUNGOMERY

Burdekin growers, in common with other Queensland cane-growers have always shown a keen desire to cut down their costs of production, and one of the problems which they grappled with over the years was an attempt to cheapen the cost of control measures against the greyback grub pest.

Current methods of dealing with this pest can be said to have been first introduced some fourteen or fifteen years ago when 10 and 20 per cent BHC dusts were successfully used as preventive treatments at a cost of £4/4/- per acre. Local efforts were later made to use 40 and 60 per cent BHC concentrates, but the sticky nature of some of these products rendered a perfect blending of these materials with their carrier somewhat difficult because they tended to agglomerate when mixed with a mineral carrier, and blocked up spray nozzles when mixed with water in an attempt to maintain a satisfactory suspension.

The next step was to use a more highly refined lindane product. This was procurable as a very fine powder resembling flour, and when this was suitably agitated in water with a suspending and wetting agent it became possible to apply this insecticide along the rows of young cane in the half-open drill much in the same way as the BHC dust was applied just before the last cultivation when the canopy of leaves was about to close over. The cost of this operation varied between £1/10/- to £2 per acre.

Machines have been evolved that will do a fair job of agitating the suspended particles and delivering the insecticide in sufficient concentrations to kill grubs. However, the ultimate in evenness of inseciticide delivery has not yet been reached and there is a marked drop in delivery rate as the liquid in the container drops to the last few gallons. Growers should therefore guard against using the machine beyond the last four or five gallons until a more efficient system of agitation has been evolved.

Some growers, in an effort to make their own units by utilizing gear from weedicide spray equipment, have put together machines which develop insufficient pressure, while in others the diameter of the pipes is too small, so these machines are doomed right at the outset to deliver an unsatisfactory, uneven application. In such instances if grub damage should subsequently develop, it will be because of the uneven application of the insecticide, rather than to the insecticide being faulty. If any Burdekin grower has reason to doubt the efficiency of his spray unit, he should consult our officers at the Lower Burdekin Sugar Experiment Station, who are well qualified to give expert advice on this matter.

Advantages of Emulsifiable Aldrin.

As a result of Bureau representations, some firms who formulate various pest control materials, have evolved an emulsifiable aldrin concentrate and a wettable aldrin powder. The value of an emulsifiable concentrate is obvious because it does not need to be agitated violently and can be delivered by any ordinary spray equipment. The cost of these two products works out at about 14/- per lb. of active ingredient aldrin and this compares very favourably with the present price of various lindane formulations. Earlier tests have shown that aldrin is of about the same standard of efficiency as lindane in killing greyback grubs but the same does not hold for frenchi cane grubs; however since frenchi grubs are not present in the Burdekin to complicate the problem of control, it will be evident that aldrin at the attractive

price quoted is a useful and profitable insecticide to use there. Furthermore in some instances there is good evidence to show that aldrin is more lasting in the soil than lindane or BHC. An additional advantage which may commend itself to Burdekin growers, in particular, is the fact that aldrin imparts no taint or off-flavour to vegetable crops grown in treated soil, and this may prove a desirable characteristic for those growers who may wish to grow potatoes as a means of supplementing their income from sugar cane.

Prevention of Damage to Cane by Wallabies

The subject of damage to cane by wallabies, when dry spring weather forces them to leave their natural feeding grounds and invade cane fields has been dealt with in previous issues of the Quarterly Bulletin. Varietal preference in the Mulgrave area was recorded in July, 1959, and in that issue also the use of the carbide gun was discussed; deterrents were the subject of an article published in October, 1960.

When an experimental approach is made to the prevention of damage, the results may be inconclusive if dry weather does not continue sufficiently long for the person carrying out the trials to satisfy himself as to the efficacy of any particular method. Rain, although welcome, may fall at at the wrong time, rejuvenating the natural feed, and thus causing the pests to depart from the cane fields voluntarily. That difficulty was not experienced when the Mulgrave area was, in 1960, subjected to a very dry period from June to December, and once again the opportunity was taken to test the efficacy of meatworks (blood and bone) fertilizer as a deterrent to wallabies. The attack commenced early in July in a field of Q.59 surrounding an introduction plot of experimental seedlings. Blood and bone fertilizer at the rate of 1 cwt. per acre was applied, on the 16th July, to the foliage of the experimental seedlings. Application time was early morning whilst the dew was still present on the leaves. After two weeks an inspection showed that complete control was established, for the wallabies had passed through the plot and on occasions had bitten the foliage, but this was immediately dropped presumably after the fertilizer was tasted. Moderate to severe damage continued in the Q.59 around the plot. After eight weeks further damage was evident in the seedlings. A second dressing was applied in late September to the seedlings and also to the adjacent rows of Q.59 with the result that damage ceased almost immediately in the treated areas but continued outside their perimeter. By mid-December, *i.e.*, ten weeks after the second application, damage was again noticed and continued until rain fell at the end of the month.

Throughout the duration of the trial, varietal preference was evident, as Pindar and Q.57 in the experimental seedlings remained almost intact whilst the Q.59 and the first damaged seedlings were subjected to attack on each successive occasion when the blood and bone began to lose its effectiveness.

C. A. R.

How Long Will It Last?

BY G. WILSON

Many growers in the Burdekin mill areas, and to a lesser extent in areas north of Townsville, are reducing the cost of grub control by using lindane in a suspension in water instead of crude BHC dust.

An important factor in the economics of BHC for grub control is its ability to retain much of its effectiveness in the soil for a considerable period, so that the amount required per acre to control grubs for the normal three-crop rotation is only half as much again as that required for one year's crop protection. This degree of persistence was observed from the use of crude BHC dust, which comprises the effective ingredient referred to as the gamma isomer, a number of closely related by-products, and the inert dust diluent. The gamma isomer, when extracted in an almost pure form, is what is now referred to as lindane.

When lindane became available the most obvious question was whether it was as toxic to insect pests as was the crude BHC. A second, perhaps less obvious, question was whether the removal of the by-products, or any difference in the size or nature of the particles, would render lindane more, or less, persistent than crude BHC in the soil.

The toxicities of the two forms have been tested, on a short-term basis, in the laboratory, using lindane of two particle sizes, one the size normally supplied to growers who are using lindane, the other a much finer particle referred to as "micronised". These tests have shown the crude BHC, and lindane, irrespective of particle size, to be equally effective against grubs, the tests being completed within a few weeks of the insecticides being mixed with the soil. It remained to be proved whether the two would retain equal toxicity when exposed to field conditions for longer periods.

Several field trials were laid down, but no results have been obtained during the past three years owing to the absence of sufficient grub infestation, although some of the trials were placed where grub damage had occurred in the same, or adjoining, field in the preceding year. The study is being continued. Grub infestations, however, remain unpredictable, so another method of testing persistence in the soil is being used, in addition.

Fig. 28—Making concrete beds for testing weedicides.

—photo G. Wilson.

At the Meringa Sugar Experiment Station concrete beds have been prepared in which crude BHC dust, lindane in two particle sizes, and other insecticides of interest have been mixed with the soil in measured proportions. Cane growing in the beds, and tillage at appropriate times, will simulate field conditions as closely as possible. Samples of the soil will be

withdrawn at intervals and the residual strengths of the respective insecticides measured by comparing the effect of the sample with that of freshly mixed insecticide against an insect pest. Even this method will require three years to provide an answer that can be related to the cycle of plant and two ratoon crops, but the process will not be subject to the vagaries of field infestation. The concrete beds, shown in the course of construction in the accompanying figure, are, at present, eleven in number, enabling other insecticides of interest to be tested.

Aldrin, for example, has shown greater promise than other insecticides tried in past field trials against the funnel ant; but other chemicals remain to be tested against this pest, and the economics, or the practicability, of their use may depend on their persistence in the soil. An over-all application of insecticide, disced and ploughed in before planting, has given better results than applications made in the drill. Since it is only practicable to apply the insecticide once in this manner during the three-crop cycle, persistence could be a deciding factor in the selection of an insecticide for extensive field investigation.

At first thought, it would appear simple to assess the persistence of an insecticide used for funnel ant control by field application. But where the insecticide has succeeded in eliminating the ants soon after its application, their re-establishment rate may vary according to seasonal conditions as well as to the persistence of the insecticide. Therefore the Meringa trials to investigate this latter effect will provide some safeguard against the mis-interpretation of the course of events.

Forecast of Approved Varieties for 1962

In accordance with usual practice, the Bureau has prepared a forecast of the changes it is proposed to make in the approved variety list for 1962. Any interested farmers' organizations which consider alterations should not be made along the lines indicated, or wish to submit any other changes, are invited to submit their views to the Director of Sugar Experiment Stations before 30th November, 1961. Any objections against varietal deletions, or suggestions for additions, must be accompanied by a detailed statement of the reasons for such objections or suggestions. No action can be taken in respect of late or unsubstantiated requests. The proposed changes are as follows:—

Mossman—Add Q.75.
Hambledon—Add Q.75.
Mulgrave—Add Q.75. Delete Q.44.
Babinda—Add Q.75. Delete Q.50 and Trojan.
Goondi—Add Q.64 and Q.70.
South Johnstone—Delete H.Q.426 and Trojan.
Mourilyan—Add Q.70. Delete H.Q.426.
Invicta (North of Townsville)—Add Q.63.
Pioneer—Add Q.63. Delete Comus.
Kalamia—Add Q.63. Delete Comus.
Inkerman—Add Q.63. Delete Comus.
Proserpine—Delete Q.56.
Racecourse—Delete Q.56 and Trojan.
Pleystowe—Delete Q.56.
Farleigh—Delete P.O.J.2878.
Marian—Delete P.O.J.2878 and Q.28.
Bingera—Add Q.71.
Fairymead—Add Q.71.
Gin Gin—Add Q.71.
Millaquin—Add Q.71.
Qunaba—Add Q.71.
Isis—Add Q.71.
Moreton—Add Q.62.

Clark's Seedling—A Tribute to a Good Variety

BY J. H. BUZACOTT

The tremendous performance of Badila in lasting as an important commercial variety for over 60 years has tended to obscure the value of other varieties which have played a less spectacular, but still important part, in the sugar industry of Queensland. Such a variety is Clark's Seedling which will celebrate its 60th anniversary in 1964.

Fig. 29—Almost 50 years ago. A crop of Clark's Seedling at Ingham in 1912. It was grown by Mr. A. G. Glover (on left).

Reproduced from the Australian Sugar Journal, March, 1913.

Clark's Seedling was bred at the Hambledon Nursery of the Colonial Sugar Refining Company in 1904, during the brief period between 1901 and 1905 when seedling raising was performed at that centre. Its original number was H.Q.426 and it was developed from seed of the old New Guinea variety, Goru, the male parent being unknown. Although only a few thousand seedlings in all were raised at the Hambledon Nursery at least two others attained considerable commercial importance. These were H.Q.285, known in South Queensland as Milton or Early Maturer, and H.Q.409, a variety which played an important part in the control of gumming disease on the Herbert River.

Following its original selection, Clark's Seedling rapidly attained popularity in the Queensland industry and by 1913 it was being grown in almost every mill area of the State. Susceptibility to gumming disease, however, rapidly eliminated it from the southern areas and it found a stable place in mill areas from Bundaberg north. It was then recognised as an important variety for early harvest, due to its high sugar content early in the season. Its other characteristics of good germination and rapid early growth also rendered it a useful variety for late planting.

Clark's Seedling is now approaching the end of its useful life. For 1961 it is approved in two mill areas only,

Mourilyan and South Johnstone, and the yearly tonnage harvested has dropped to 5,000 tons or less. In the peak of its fame the annual amount harvested is unknown because exact tonnages of varieties in the State were not kept until the Sugar Experiment Stations Acts of 1938 rendered it obligatory. In 1939, the first year of complete records, 374,000 tons were harvested and since that date the tonnage has been progressively less each year, so it is obvious that its peak year was probably reached some time prior to 1939. The total tonnage of Clark's Seedling harvested from 1939 up to the present time is some 3,160,000 and it would be fairly safe to say that the tonnage of the variety harvested during its life would be double that figure. Whilst this is not a big tonnage compared with the really great varieties such as Q.50, which in its best five years produced nearly 13,000,000 tons, Pindar, which in its best five years produced 11,500,000 tons or even Trojan, which was responsible for 7,200,000 tons in its most productive five-year period, nevertheless Clark's Seedling played an important part in the industry and well deserves a meed of praise before it slips into obscurity.

There is now some doubt whether Clark's Seedling will still be an approved variety when it reaches it's 60th birthday in 1964, as the area planted is now so small that its withdrawal from the approved lists seems at most only a matter of a year of two. Whether approved or not it is certain there will still be some ratoon plots in existence in 1964 which might allow this stalwart old variety to share with Badila, at least for many years to come, the honour of appearing in the archives as the only variety in Queensland to survive commercially for 60 years.

Greenhill—Past and Present

Searching through early numbers of the Australian Sugar Journal for historical data, in an issue dated February, 1910, an article was noticed entitled "The Cane Grub Pest". In it the following noteworthy paragraph appears:—

"A recent contributor to the 'Cairns Post' states that efforts made for some time past, to cope with the ravages of the cane grub, are producing an appreciable effect. At Greenhill, where the cane grub has brought about a reduction in tonnage of cane from 32,000 to about 600, it is believed that the systematic destruction of beetles will shortly enable the land to return to something like its old productiveness."

These figures seemed a little fantastic even to one who is very familiar with the immense destruction caused in the past by the cane grub. Accordingly a little further historical research was conducted and the following statement unearthed from the Annual Report of the Director of the Bureau of Sugar Experiment Stations for 1919:—

"At one large estate it was stated that out of an estimated crop of 12,000 tons only 4,000 tons would be cut, the remainder having been destroyed by grubs. On this estate it is estimated that the loss by grubs during four years has been 98,000 tons of cane, an immense monetary loss."

This statement by the then Director undoubtedly referred also to Greenhill Plantation which, at that time, farmed about 1,000 acres. The present regular annual production of upwards of 25,000 tons of cane annually, free from grub damage, in this same area is some indication of the great benefit conferred on far northern canegrowers by the introduction of benzene hexachloride to the industry.

J. H. B.

A Promising Pre-Emergence Weedicide

BY C. A. REHBEIN AND G. H. WHITAKER

There has been controversy about pre-emergence control of weeds ever since weedicides were first introduced. When 2,4-D was in the experimental stage good results were obtained, although some, then unexplained, failures did occur. Advanced techniques in the testing of weedicides have proved that soil organisms do diminish the efficacy of 2,4-D when it is repeatedly applied on the same area.

The Bureau has for some time been receiving samples of new weedicides to test their reactions. An opportunity was taken in February this year to set down at Meringa, with six different weedicides, a pre-emergence trial on a field which was known to be heavily seeded by broad-leafed weeds and grasses. The soil type was a light brown alluvial scrub soil which had been ploughed and disced to a fine

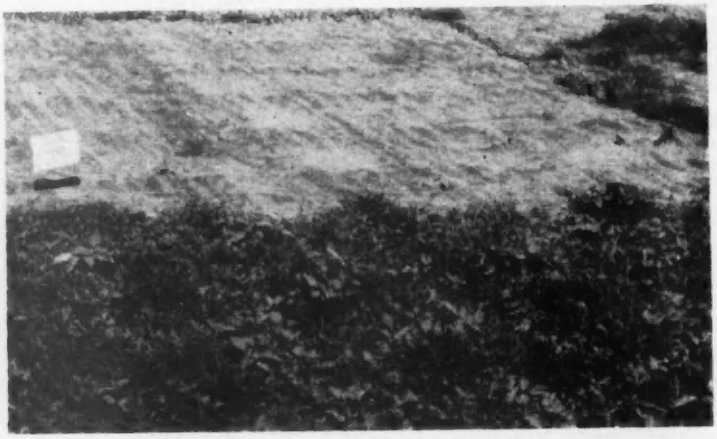

Fig. 30—Taken eight weeks after spraying with Fenatrol S.,The weed growth in the foreground is in a plot which was sprayed with 2, 4-D at 4lb. per acre at the same time.

—photo J. H. Buzacott

However, there are still growers who have persisted with the use of 2,4-D as a pre-emergence weedicide. They are obtaining satisfactory results in the early stages of the crop, but some difficulties arise in making the later sprayings that have been found necessary to give protection after the crop has had its last cultivation. This is a very important part of the weed control programme and a weedicide of considerable lasting effect is required to obtain a control that will persist from the early stages of the crop when sprayings can most easily be carried out.

tilth just prior to the application. Moisture below the top dry layer was adequate, and 250 points of rain fell on the 7th and 8th day after spraying, followed by another 250 points in the next week. Growth of weeds in the control plots was prolific and vigorous.

The result of this trial showed that "Fenatrol S" gave remarkable pre-emergence control under conditions which were considered severe. Although this trial was on fallow land the weed growth was much more dense than is normally expected in a growing cane crop. "Fenatrol S" has a chemical formula of 2,3,6 trichlorophenyl acetic

acid, and is a dark brown liquid which mixes readily with water. It contains 1.8 lb. acid equivalent per gallon as the sodium salt. The rate of application was 2¼ gallons in 60 gallons of water per acre, *i.e.*, 4 lb. active ingredient/acre. Between 10 and 14 days after spraying, a dark brown stain appears on the soil of the sprayed area and this feature can be used as an indication of how well the spraying was carried out. Very few weed seedlings appeared during the ten days after spraying but most of these plants died off before reaching the two-leaf stage. After 19 weeks, during which period 21 inches of rain fell, the only plants which are now growing in the plots are—two wild passionfruit, two stools of couch grass, one plant of bluetop, one pink burr and several stools of barnyard grass. There has been no further weed growth within the plot itself. Some seed from an outside source fell on the plot and germinated but the seedlings were killed off almost immediately. It is surmised that the passionfruit and couch grass are resistant as they appeared quite early after spraying and have shown no detrimental effect from the "Fenatrol S"; however, the bluetop, burr and barnyard grass are unthrifty and stunted and could be described as "escapes".

Even with the above plants in the Fenatrol plots a comparison made with 2,4-D or the untreated controls shows that this new weedicide is almost 100 per cent effective. A second trial commenced on the 15th March has definitely given 100 per cent control for 16 weeks with as low a dosage as 1¼ gallons/acre. However, no success has been obtained with it as a post emergence spray to date.

Further trials in young plant cane, and later on in cane which is out of hand, will be set down and the results published. At present no price is available and stocks of the product are very limited even to the firm which supplied the experimental material.

Fig. 31—Taken 16 weeks after spraying with Fenatrol S. The weed growth in the background is up to four feet high and is in a plot which was sprayed with 2, 4-D at 4lb. per per acre at the same time.

—photo B. T. Egan

Investigations into Control of Oat Grass

BY C. M. MCALEESE

In the Mackay district during the last three years spread of *Themeda quadrivalvis* (known locally as "oat grass") has been rapid and extensive, particularly along roadsides. From there spread has extended into adjacent cane blocks and fallow land. Cultivation of the young cane exercises control but, after the cane reaches the "out of hand" stage, further germination takes place and the grass will eventually attain a height approximating six feet.

Early in May, a suitable site was obtained for an exploratory weedicide trial. This area had previously been mown and when the trial was set out the ratoon grass growth was in seed and eighteen inches high. The trial was commenced on the 5th May under good conditions, About one and a half inches of rain had fallen during the week and showery conditions prevailed for some days after the trial was set out.

Treatments used were as follows:

(1) Dowpon at the rate of 8 lb. per acre, without wetting agent.
(2) Dowpon at the rate of 4 lb. per acre, resprayed with a further 4 lb. per acre on the 12th May.
(3) Dowpon at the rate of 8 lb. per acre.
(4) TCA at the rate of 25 lb. per acre.
(5) Weedazol Total at the rate of 8 lb. per acre.
(6) Vorox 80 at the rate of 3½ lb. per acre.

Treatments (2) and (6) inclusive had a one per cent solution of Teepol, as a wetting agent added. The weedicides selected were applied at comparative costs.

Dowpon.

Dowpon treatments (1), (2) and (3) had had little apparent effect by the 9th May but, by the 22nd May, foliage had died although seed stems were still green. Inspections on the 22nd June revealed that the seed stems were brown and drying out. The ground stubble was still green and the grass was alive.

Death of some plants had occurred by the 11th July. Treatment (1) had given 80 per cent control by the 20th July, treatment (2) 70 per cent control and treatment (3) 60 per cent control. Plants remaining alive had a green stubble, and some malformed shoots were appearing. At this stage treatment (1) without added wetting agent has given better control than treatments (2) and (3).

Fig. 32—Themeda quadrivalvis well established in a cane row. This golden coloured grass is known locally in the Mackay district as oat grass.

—photo H. E. Young.

TCA, 25 lb. per acre.

This treatment had the earliest effect. Burning of the foliage and stems was noticeable by the 9th May. Death of smaller plants had occurred by the 22nd May. Large plants only, remained alive by the 22nd June. By the 11th July only an odd plant was alive and these had small malformed shoots appearing at the base of the plant. An inspection on the 20th July revealed that all plants had died.

Weedazol Total and Vorox 80.

Treatments with Weedazol Total (8 lb. per acre) and Vorox 80 (3½ lb. per acre) were disappointing. The foliage of the plants was browned by the 22nd May and, by the 11th July, the seed stems had become brown, but the plant at the base was still green. No dead plants could be found at the last inspection. Some side shooting was occurring and these were making normal growth.

Conclusion.

It does appear at this stage that TCA and/or Dowpon will prove to give satisfactory control of *Themeda quadrivalvis*.

Further trials will be set out under more favourable conditions existing in the spring.

Application of Insecticides to Bundaberg Canefields for Soldier Fly Control

The Bureau's experimental work against soldier fly has advanced to the stage where it was decided that field application of insecticides for control was both an economic and practical possibility. Since the boom spray equipment available locally was not designed to handle lindane satisfactorily, and because it is essential that the insecticides be applied uniformly the Bundaberg Cane Pest and Disease Control Board decided to purchase spray equipment similar to that used in the Burdekin area for the control of greyback grub. Modifications allow a broadcast application of insecticide to be made to an 18 feet wide strip of fallow land. Its construction also allows its use with most popular makes of tractors.

The equipment is under the control of the Supervisor, Mr. N. Courtice, and is available, free of charge, to any grower who wishes to apply insecticide to his fallow land. Mr. Courtice supervises all applications to ensure that the insecticide is applied satisfactorily.

The first applications were made during mid-March and since that time some twenty growers have applied insecticides to more than 200 acres of fallow land, mostly in the South Kalkie, Waterview, Fairymead and Avoca areas.

Lindane has been used in most fields, but some aldrin has also been tried. With both insecticides 8 lb. active ingredient per acre has been used. Insecticides have been worked into the soil by both ploughing and discing, *i.e.*, deep compared to surface placement. In one field the insecticide was applied after the cane had been planted and was worked into the soil with a cotton king. Field application commenced in mid-March and will continue probably up to August. Wherever the farmer was agreeable, untreated strips were left for comparison purposes.

The Supervisor has kept a record of the type of insecticide used, rate of application, method of working into the soil, etc., and the farmers have also been asked to keep a check on the various cultivations they perform up to the time of planting.

It is expected that this information will be of great importance in interpreting results of ratooning in these fields after harvest in 1962.

R. B. M.

Enough is Sufficient

BY L. G. VALLANCE

Many cane farmers will be interested in the results to date of a phosphate trial at present being conducted on Mackay Experiment Station. This trial has been in progress for the past eight years, during which period six crops of cane have been harvested from it.

The trial was set out on a soil which contained reasonably good amounts of phosphate and one of the main objectives was to find out whether the amount already present in the soil was sufficient for maximum production, or whether it would be necessary to add further phosphate in the form of fertilizer. A second reason for establishing the trial was to see whether finely ground rock phosphate could be used in place of the usual phosphate fertilizer, *i.e.*, superphosphate.

The experiment was commenced on a first ratoon crop of Q.50 in 1952. Since that date all plots have received the same amount of notrogen and potash in the form of sulphate of ammonia and muriate of potash, but the amounts of phosphate per acre per crop have been varied as follows:

> 1. no phosphate; 2. 2 cwt. superphosphate; 3. 4 cwt. superphosphate; 4. rock phosphate equivalent to 2 cwt. superphosphate; and 5. a mixture equivalent to 2 cwt. superphosphate but partly as superphosphate and partly as rock phosphate.

The first ratoon crop of Q.50 was harvested in 1953 and the second ratoon was cut the following year. The block was then ploughed out and re-planted with Q.58 in 1955. The plant crop and first and second ratoons of this variety were harvested in 1956, 1957 and 1958. The block was again planted in 1959, this time with Q.68, and the plant crop of this third cycle was harvested during the 1960 crushing season.

YIELDS, tons cane per acre

Phosphate Fertilizer	Average yield per crop
1. no phosphate	25
2. 2 cwt. superphosphate	23
3. 4 cwt. superphosphate	25
4. 2 cwt. as rock phosphate	25
5. Super plus rock phosphate	25

Results.

At no time in any of the six crops that have now been harvested was there any evidence that the use of phosphate fertilizer was warranted. As shown in the accompanying table the plots which received no phosphate averaged 25 tons per acre over the period. This should be compared with 23 and 25 tons per acre for the plots receiving 2 cwt and 4 cwt respectively of superphosphate. The drop of 2 tons of cane per acre in the 2 cwt. plots is of no significance and is merely due to the normal variation that occurs within a block of cane.

Since the results showed quite definitely that superphosphate was not required it was to be expected that the rock phosphate and the mixed superphosphate-rock phosphate treatments would also show no response. That this was the case can be seen from the yields of 25 tons per acre as given in the table.

The results indicate the waste of money that can be incurred by using high phosphate mixtures on soils that already contain sufficient amounts of this plant food. In this particular field an analysis before the trial was started showed that the soil contained 62 parts per million of available phosphate.

Fig. 33—In the glasshouse at Bundaberg Sugar Experiment Station cane seed is planted in these trays of soil for the production of new varieties.

—photo N. McD. Smith.

Fig. 34—Larva of a soil-frequenting insect resting in a soil cavity.

—photo G. Wilson.

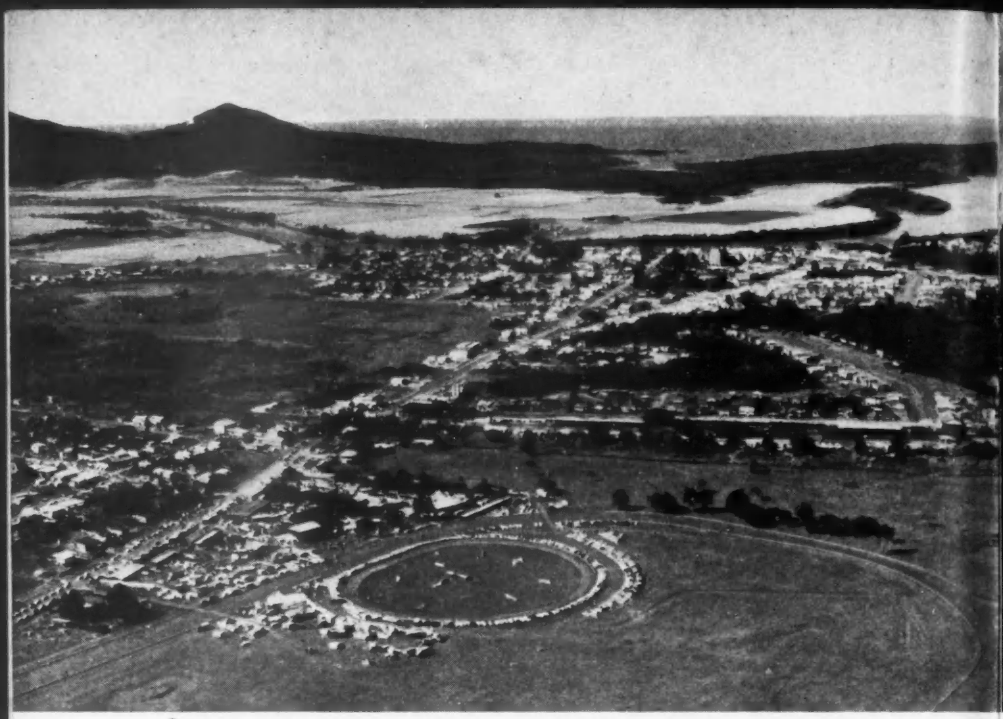

Fig. 35—Innisfail during 1960 Annual Show. Canelands of Innisfail Estates in distance.
—photo J. H. Buzacott.

Fig. 36—The farm of Mr. C. White in the Upper Mulgrave Valley.
—photo J. H. Buzacott.

Fig. 37—A new seedling cane 54N. 6441, now Q.75, being cut for plants for further trials. At Figtree Creek, Babinda.

—photo J. H. Buzacott.

Fig. 38—A rake of cane at Nambour.

—photo Dept. Agric. and Stock.

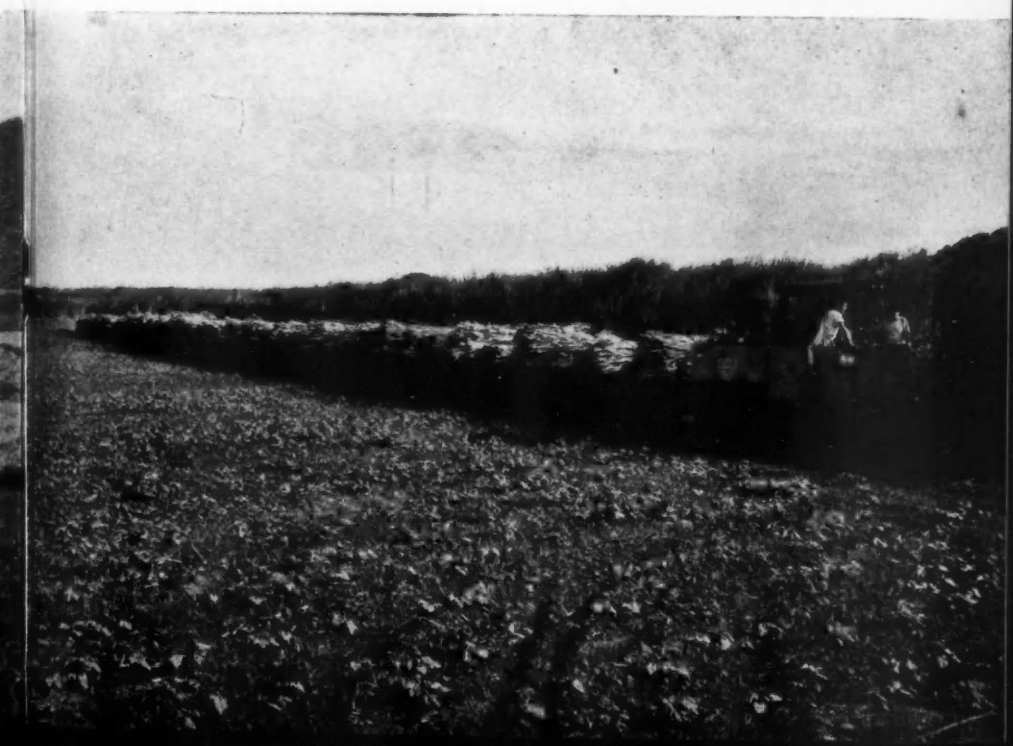

Fig. 39—Field Day at Bundaberg Sugar Experiment Station. Toft Bros. loader in foreground.

—photo J. H. Buzacott.

Fig. 40—Loading cane for Pioneer Mill.

—photo L. G. Vallance.

The Outbreak of Leaf Scald and Dwarf Diseases in the Central Area

BY E. A. PEMBROKE

After its absence for many years from the Central districts the presence of leaf scald disease was established in the variety Q.63 in May, 1960, at The Cedars—a sub-area of the Farleigh mill area. As in similar cases of emergency, disease control measures were brought into operation to cope with this out-break. The provisions of Proclamation No. 39 were implemented by the Bureau, which enlisted the co-operation of the local Cane Pest and Disease Control Board in making the necessary surveys. The procedure adopted was:—

1. The farm was immediately quarantined, and both the planting of Q.63 and the sale of plants of any variety were prohibited.

2. The sources of plant supply were checked. Inspections showed that, two generations back, Q.63 was free of disease. One generation back it was found to be diseased. Plants from this diseased source had been sold to four growers.

3. Single row inspections were made of all known leaf-scald susceptible varieties on these properties.

4. A local quarantine area, involving some thirty farms in the immediate locality, was established.

5. Two-row inspections were made of all known susceptible varieties on these farms.

6. Where possible, known leaf-scald diseased blocks were ploughed out after harvest. Permission was granted to ratoon some blocks.

7. There was close surveillance of any remaining diseased blocks by the Cane Pest and Disease Control Board.

8. District-wide inspections were made of all Q.63 being used for plants to determine the incidence of the disease in this variety, and all plots of experimental canes known to be susceptible were also inspected. The disease was not located outside The Cedars area.

Upon confirmation of the disease, the Cane Pest and Disease Control Board Supervisors from Proserpine and Plane Creek mill areas were invited to Mackay, and the various symptoms of leaf-scald disease in the Q.63 were shown to them. Immediately on their return to their own districts they inspected Q.63 for this disease. Leaf scald has not been found in the Plane Creek mill area.

During the initial survey at Proserpine, leaf-scald disease was reported in Q.63 on four farms in the Hamilton Plains area. Further inspections have brought the total to eight farms in this particular locality. The presence of the disease on two other farms some distance from the infected area can be traced through plant sources. The same system of harvest and plough-out described above has been employed where possible and will be enforced again during 1961.

Movements of plants from both these areas has been restricted because of the presence of chlorotic streak disease and moreover, the rough terrain of The Cedars area has reduced plant transfers in that district. It is fortunate the disease has been confined because of these conditions. Topography has restricted the amount of Q.63 planted in The Cedars area. The more resistant major varieties Q.50, Q.58 and N.Co.310 are grown extensively and this has assisted in confining the extent of the outbreak.

All known diseased blocks of Q.63 will be ploughed out by 1962. It is expected that this action, combined with the reluctance to grow Q.63, will lead to the control of leaf-scald disease at an early date.

The growing of more-resistant varieties is being encouraged in the

Hamilton Plains area. The policy of harvest and plough-out of diseased blocks will continue as a method of control. A further precaution is the introduction of the progeny of three-hour hot-water treated Q.63 from a disease-free source in the Mackay district. After propagation this cane will receive a further three-hour treatment before replanting. Eventually distributions from this new source will replace existing stocks of Q.63 in Proserpine.

Dwarf disease which is confined to the Mackay and Plane Creek districts has existed there since 1930. It is endemic in the Rosella and Bakers Creek areas and has been found at Peri, Eimeo and Carmila. Other sugar-producing countries have not recorded dwarf disease. The natural spread is slow except in very susceptible varieties and the disease can be readily controlled by the use of resistant varieties, careful selection of planting material and roguing of diseased stools. This disease was found for the first time in The Cedars area in 1960 and the outbreak was traced to an introduction of Q.68 made to one farm in 1956; the diseased plants came from Bakers Creek. The same procedure as already described for leaf-scald disease was adopted. The five farms known to have purchased Q.68 plants either directly or indirectly from this diseased source were inspected. Where possible diseased blocks were harvested and ploughed out. Blocks which were not to be ploughed out were harvested early, then inspected and rogued in the early ratoon stage. Three such blocks remain to be ploughed out after harvest in 1961. It is hoped that dwarf disease will be eradicated from The Cedars area following the harvest of these blocks but, having in mind its persistence for a long period of years in the Rosella-Bakers Creek area, it will be necessary to watch these Cedars farms carefully for a long time to come.

The sudden and unexplained re-appearance of leaf-scald disease in the Mackay and Proserpine districts after an absence of many years and this unwitting introduction of dwarf disease emphasises the fact that vigilance is the price of successful disease control.

A Better Kill Under Shade

With the advent of aerial spraying to kill weeds just prior to harvest in North Queensland, it has been observed that, in many cases, "winter weed" (*Ageratum houstonianum*) growing amongst the cane crop has been successfully killed, whilst that growing around the headlands in the same fields is relatively unaffected though similarly treated.

Investigations carried out overseas have shown that, with the plants concerned, the effect was due to the greater resistance to wetting with the weedicide; this resistance is developed in plants growing in the open, compared with the same plants growing in shaded conditions. This differential wetting effect resulted in more of the spray being retained on, and being absorbed by, the plant in shaded conditions than when growing in the open.

H. E. Y.

The Poor Ratooning Problem

Such fast progress has been made in clarifying this problem in the past year that the Bureau is now in a position to issue firm advice on pre-planting treatment in those cases where rhyparida grubs or soldier fly larvae are responsible for the ratoon failures;—and these are the culprits in the majority of cases. In the near future publicity will be given to the recommended control measures.

Giant Sensitive Plant Investigations:

Soil Sterilization of Small Seed-Infested Areas.

BY S. O. SKINNER AND I. T. FRESHWATER

As is to be expected with the development of any pest plant which is easily spread and which is being introduced as an adulterant in other seed, the infestation of giant sensitive plant (*Mimosa invisa*) in North Queensland includes innumerable small patches, frequently located in remote and otherwise clean areas. While these are to be found mainly in localities not far distant from the two principal centres of infestation, Innisfail and Tully, scattered patches have been discovered from Mackay to north of Mossman.

The patches, when found, are often little more than 100 square feet in area and the plants existing within them can be readily destroyed. However, with the ability of the seed to remain dormant in the soil for many years, the spots present long-term sources of danger and need regular attention.

Main control of these patches to date consists of spraying the pest and associated herbage with an arsenical weedicide, and later burning. This produces a bare surface which can be watched closely for any further germinations which usually take place. This method is most effective, but it has the obvious disadvantages of danger to stock and wastefulness of labour because of the travelling involved. Much more preferable would be the complete eradication of the pest plant from these patches and, to this end, several early attempts were made to destroy all seed by "burning" the soil. Heavy usage of oil, old tyres, etc., was made but, in the main, these attempts were both futile and cumbersome.

From the middle of 1960 trials were commenced in an attempt to secure long-term sterilization by the practical

Fig. 41—A plot treated with 2, 4-D four and a half months earlier at rate of 2 lb. per 100 sq. ft. Note heavy grass and weed growth in untreated area at rear.

—photo S. O. Skinner.

Fig. 42—A plot treated with 2, 4-D eight and a half months before. Odd plants of giant sensitive plant are now showing but the area is clear of grass for examination and further treatment.

—photo S. O. Skinner.

means of applying a chemical to the seed-infested soil. On a heavily seed-infested soil at South Johnstone, the undermentioned materials were, or still are, under trial using the various methods of application described:—

1. On the 11th July, 1960, exploratory applications at the rate of two pound acid equivalent per 100 square feet were made of the sodium salt and amine forms of 2,4-D. The former was dusted, the latter sprayed, onto the soil surface.

2. On the 24th November, 1960, further plots were set out using: Borascu 10 lb per 100 square feet applied as a dry dressing; Simazine 0.75 ounces per 100 square feet applied as a spray; Polybor-chlorate four pound per 100 square feet applied as a spray—and 2,4-D again at the rate of two pound acid equivalent per 100 square feet. The amine form was used for convenience, this treatment being included as a standard since it showed promise in the previous trial.

3. From the 12th-14th December, 1960, a trial with methyl bromide at the rate of two pound per 100 square feet and involving a fumigation period of 48 hours, was set out.

4. On the 31st January, 1961 a further series of plots was initiated using:

Karmex (Diuron) at the rate of 3.2 ounces per 100 square feet, applied as a spray.

Vorox Granular. A proprietary compound of amitrol and simazine (triazines) applied as a dry dressing at the rate of 24 ounces per 100 square feet.

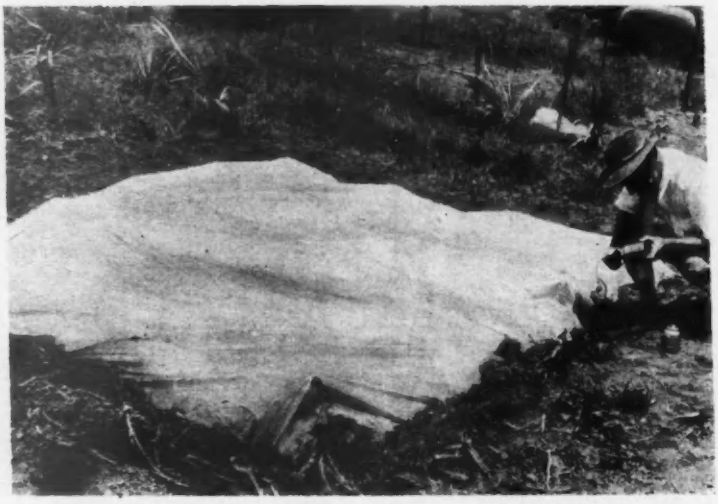

Fig. 43—Treating with methyl bromide for giant sensitive plant control. The fumigation actually improved seed germination but the young plants failed to grow or survive.

—photo I. T. Freshwater.

Vorox 80. Another proprietary compound of amitrol and simazine, in this instance applied as a spray at the rate of 1¼ ounces per 100 square feet.

2,4-D. Again applied as a standard, at the now accepted rate of two pound active ingredient per 100 square feet. The amine form was used once more.

5. Up to this stage, except for the methyl bromide, all plot sites and perimeter areas, as checks, were chipped clean prior to the application of the various chemicals. This was under-

taken to give a clear picture of the performance of all materials. However, to secure a much easier and more practical method of removing undue vegetation which could interfere with the even application of the treatments, a considerable area of grassed land was treated in mid Februray, 1961 with an arsenical spray and burning, and quick rough scything. To this area some fourteen plots, mainly of the two most promising materials to this date—Borascu and 2,4-D—were set out.

comparison areas. Photographs 1 and 2 show the spectacular results on typical 2,4-D plots.

In the grassed plots, that were roughly scythed down to a height of approximately three inches, a feature of unusual interest was the rapid and thorough kill of quite dense summer grass by the 2,4-D.

Borascu.

Following a quick, rather heavy germination of summer grass and some

Fig. 44—The methyl bromide treated plot three months after fumigation. Note the thick growth of giant sensitive plant outside the plot boundary. A month later giant sensitive plant began to develop normally in the treated section.
—photo I. T. Freshwater.

Results.

2,4-D, Borascu, and Karmex proved the most promising.

2,4-D

2,4-D, most consistent in its results, gave completely bare ground for six months, after which odd plants germinated. Overall, however, the soil remained bare in appearance (which would permit the ready observation and destruction of any giant sensitive plant) for nine months, compared with very dense, vigorous growth of the pest and of grasses within the surrounding

giant sensitive plant, the young seedlings failed to develop and slowly died out eventually to give results comparable to the 2,4-D, although with several plots, it was a little less consistent.

Karmex (Diuron).

This was included in a later series of trials at the end of January, 1961, and the soil remained completely bare at the end of July, some six months after application. This was pleasing since, by comparison, a similar aged 2,4-D plot was just commencing to show occasional, small, weed seedlings.

Vorox Granular and **Vorox 80**

Gave good early soil sterilization but were not lasting.

Simazine and **Polybor-chlorate,**

Likewise, could not be compared with the 2,4-D, Borascu, and Karmex.

Methyl Bromide.

Prior to the fumigation samples containing 100 seeds of giant sensitive plant in pervious containers were placed under the plastic sheeting. One such sample was on the soil surface and others at depths of six and nine inches in the soil. These, along with another non-fumigated seed sample were test germinated after the treatment and the seed sample left on the soil surface gave a vastly improved germination over all others. In the trial plot itself, this rather unexpected finding was substantiated by a heavy continued germination of giant sensitive plant. Also of interest was the fact that it was the only plant species to germinate.

However, almost equally surprising as the improved germination, was the failure of the seedlings to develop any vigour, and the majority slowly died. However, after four months, the plot commenced to produce a vigorous crop of the pest.

Summary.

The work was conducted in conjunction with the Noxious Plants Inspector of the Co-ordinating Board and the Supervisor of the South Johnstone Cane Pest and Disease Control Board. From the results, the use of 2,4-D, Borascu or Karmex is worthy of wide trial usage against spot infestations of giant sensitive plant. Applied late in the spring, at the commencement of the main germinating period of the pest, indications are that control during at least one growing season might well be expected. Cost, based on the most readily available material, 2,4-D, at current price levels would approximate 10/- to 12/6 per 100 sq. feet.

A New Weed on the Burdekin

A weed growing on two cane farms in the Lower Burdekin area, which was previously thought to be Johnson grass (*Sorghum halepense*), has now been identified as another species *Sorghum miliaceum*. *Sorghum miliaceum* resembles Johnson grass very closely but is more vigorous and has thicker rhizomes and drooping branches. This is the first record of the plant in Australia. However, as it is so similar to Johnson grass, it is felt that other infestations of what is thought to be Johnson grass may possibly be *Sorghum miliaceum*. The Bureau of Sugar Experiment Stations is now investigating this. The weed on one of the farms was confined to a small patch and several isolated stools. The patch has been fumigated with methyl bromide and the stools dug out with the object of eradicating it there. The other area is much larger and an endeavour is being made to confine it to its present bounds pending further investigation.

The grass species of this type with underground rhizomes now recorded in Queensland are *Sorghum halepense* (Johnson grass), *Sorghum propinquum* from an isolated patch on the Atherton Tableland, *Sorghum almum*, the "Columbus grass" introduced for grazing purposes, and *Sorghum miliaceum*. Johnson grass originally came from the Mediterranean area, *Sorghum propinquum* and *Sorghum miliaceum* from Asia whilst *Sorghum almum* is a hybrid species originating in South America.

H. E. Y.

The Problem of Late Growth of Weeds in Cane

BY A. G. BARRIE

The late growth of weeds in cane is a problem of some magnitude in many canefields, particularly in those areas where mechanical harvesting is being increasingly adopted. The Bureau proposes to carry out a series of investigations to determine the best methods of control and the results of this work, together with further information on the subject, will be published in subsequent issues of the Quarterly Bulletin. This present article by Mr. Barrie is the first of a series and its object is to draw attention to the various methods of approaching the problem.—(Editor.)

The problem of late weed growth in cane—that is, growth of weeds after normal cultivation ceases—has become of increased importance because of the larger areas being harvested mechanically. Vines such as convolvulus and prickly cucumber which are intertwined around the cane stalks and leaves constitute part of the problem, while the other part consists of weeds growing close to the ground, such as blue top and *Crotalaria* sp. This article discusses the advantages and disadvantages of the present and possible future methods of dealing with the problem.

The following table lists the possible methods for dealing with the problem.

General Method	Specific Method
Mechanical	Hand Chipping
	Inter-row cultivation
Ecological	Shading by the crop
Chemical	Pre-emergence
	Post-emergence aerial spraying
	Post-emergence ground spraying

MECHANICAL METHODS

These two methods, hand clipping and inter-row cultivation do not appear to present very great potential. Hand chipping is very costly and requires a great deal of time and effort. Inter-row cultivation may be reasonably effective for weeds in the interspace but it does not affect weeds growing in the cane row except for smothering. young weeds with soil, and relatively dry conditions have to be experienced for successful control by this method. Late growth of weeds is generally associated with wet soil conditions, so this method has definite limitations. In addition lodged or sprawled cane may prevent the use of inter-row machines.

ECOLOGICAL METHODS

Suppression of weed growth by the shading associated with good cover of the cane crop is a very important method of dealing with this problem. Varieties differ in the denseness of the cover, but poor cover may result from insect attack or unfavourable seasonal conditions in a variety which normally has good cover. In addition, there are some species of weeds which are capable of germinating and growing under the shaded conditions. The varietal characteristic of good cover, therefore, may be regarded as a very important aid in reducing the magnitude of the problem, rather than a complete solution.

CHEMICAL METHODS

The methods involving the use of chemical weedicides appear to present the greatest potential for dealing with the problem and the advantages and disadvantages of the various methods will be discussed more fully.

(*a*) *Pre-emergence.* This method appears to present great possibilities and the procedure would most likely be to apply the pre-emergence weedicide at some time before the cane is out of hand. The weedicide would have to have the characteristic of long persistence in the soil and a period of 2-3 months would probably be required. This method is advantageous in that it destroys weed seeds before they have

done any damage to the cane crop through competition and also before they have seeded. Also, it should be possible to select a weedicide that would be effective against grass as well as the broad leaf weeds. Such a treatment would reduce the weed seed population, and with continued treatment, the seriousness of the problem would tend to diminish.

The first pre-emergence weedicide to be used extensively in Queensland was 2,4-D, but this chemical has very definite limitations because of its rapid decomposition by micro-organisms in the soil. Newer pre-emergence weedicides have the ability to persist in the soil for long periods and some of these offer a possible solution of the problem. Such new weedicides have to meet three exacting requirements. Firstly, they have to be effective against weeds under a wide range of conditions of soil and climate. Secondly, they have to be of such a price that they will compete economically with other methods of weed control. Thirdly, they must not create additional problems by interfering with crop growth or some vital soil process. With the very large number of weedicides now being synthesised by the chemical companies this appears to be a promising field.

(*b*) *Post-emergence.* Post-emergence spraying with chemicals consists of spraying the weeds at some stage between emergence from the soil and natural death of the plant. Post-emergence spraying for the late weed growth problem may take one or two forms. Firstly, the weeds may be sprayed some considerable time prior to harvest of the cane. In this case it is essential that very little or no damage be done to the cane. Secondly, the cane and weeds may be sprayed just prior to harvest with a chemical which would rapildy dry out the leaves of the weeds so that they burn in the fire. In this case damage to the tops would be of lesser significance, since they are of no economic importance at the present time. It is considered that this latter method should be regarded as a "stop-gap" method only, because it would be destroying weeds after they had seeded. As a result the problem in the succeeding years would be of equal or greater magnitude.

In spraying with weedicides to control weeds but leave the cane undamaged two possible methods of application present themselves. They are ground spraying and aerial spraying. The advantages and disadvantages of these two methods will be discussed under a number of headings:—

1. Placement of the Weedicide.

In ground spraying with inter-row equipment most of the weedicide falls on the weeds and only a small proportion on the cane, particularly where such weeds as blue top are being sprayed. With aerial spraying a large proportion of the spray is intercepted by the cane leaves. From the economic point of view the cost or convenience of application may counterbalance to some extent the value of the extra weedicide necessary for the aerial application. However, this question is not only one of economy of the weedicide and convenience of application but also of possible damage to the crop. This aspect will be dealt with under the headings of "Maximum Quantity of Weedicide Possible" and "Range of Weedicides Possible". For the weeds which are intertwined with the leaves of the cane the question of placement may be of less importance.

2. Maximum Quantity of Weedicide Possible.

The resistance of cane to damage by the weedicides used at present (*e.g.*, the phenoxy-acetic acid group) is relative rather than absolute and if high enough concentrations of the weedicides are used damaged cane will result. Similarly the ability of chemicals to kill the weeds frequently depends on the concentration of the chemical. Since a large proportion of the weedicide falls on the cane leaves in aerial spraying and only a small proportion in ground spraying, it follows that much greater quantities of weedicide can be applied to weeds

by the ground spraying than aerial spraying with the same risk of damage to the cane crop. These remarks apply primarily to the blue top-*Crotalaria* sp. part of the problem.

3. Range of Weedicide Possible.

Another consequence of the difference in placement of the weedicide by the two methods is that greater restriction is placed on the type of weedicide for aerial spraying than for ground spraying. It requires a high degree of selectivity for a weedicide to destroy weeds and leave cane undamaged when the cane comes in more intimate contact with the weedicide than do the weeds. It seems likely that, in testing new weedicides to deal with this this problem, many good weedicides would have to be discarded in order to meet the selective properties demanded by the aerial spraying method. Here also these remarks apply primarily to the blue top-*Crotalaria* sp. part of the problem.

4. Timing.

The susceptibility of a weed to a weedicide varies considerably throughout the life of the plant and also according to the weather conditions. For maximum effect of the chemical "good timing" is essential. In most instances ground equipment, which is owned and operated by the farmer, would have the advantage over aerial spraying in this respect.

5. Drift of the Weedicide.

Damage to susceptible plants growing in close proximity to the sprayed canefield is a hazard with aerial spraying, particularly under windy conditions. On the other hand there are possibly many canefields in which this factor is not of particular importance. If reasonable care is taken the danger is negligible with ground spray equipment.

6. Soil and Cane Conditions.

In many instances the wet conditions of the soil and the lodged or sprawled condition of the cane precludes the use of inter-row machines and here the aerial spraying method has a decided advantage.

CONCLUSION

The most promising methods of dealing with the problem of late growth of weeds in cane appear to be those utilizing chemical weedicides. From a long term point of view it would appear that pre-emergence weedicides may provide an excellent means of dealing with the problem. However, at present, post-emergence weedicides offer a reasonable solution. In considering the advantages and disadvantages of aerial spraying versus ground spraying it appears that ground spraying has the advantage in regard to economy of the weedicide, minimizing the risk of damage to the crop and adjacent plants, the range and maximum concentration of weedicides that could be used, timing of the application for maximum effect. Aerial spraying has the advantage when the soil and crop conditions prevent the use of ground spray equipment.

Bound Copies of Quarterly Bulletin

The Bureau has in stock a small number of bound copies of Volumes 23-24 of the Cane Growers' Quarterly Bulletin. These are available to growers and millers in the industry at a price of 16/- each. Any orders should be addressed to the Bureau of Sugar Experiment Stations, 99 Gregory Terrace, Brisbane.

The price to overseas purchasers will be £2/16/- (Aust.) which includes the cost of the two years' issues of the Bulletin which are bound to make Volumes 23-24.

53.S.47

BY H. G. KNUST

The title, 53.S.47, conveys little to many canegrowers in southern Queensland at the present time. It is the designation by which we know a promising advanced seedling cane raised on the Southern Sugar Experiment Station, Bundaberg, in 1953.

This seedling was produced by crossing 38.S.N.4305, a cane bred by the Colonial Sugar Refining Co., with Co.331, a commercial cane from Coimbatore, India. It was one of 180 of that cross planted in our block of seedlings in 1953, selected in 1954 and allotted the seedling number 47; hence the title 53 for year of breeding, S for southern and the seedling number 47.

It is a high-yielding, vigorous cane of medium thickness which, although sometimes developing a slight lean, has never lodged even when crops reached the 55 tons-per-acre mark. Germination is reliable before and after long hot-water treatment. Ratooning is good though possibly slower than the fast ratooning commercial varieties. We noted in 1957 that its drought-resisting qualities were satisfactory and this has been confirmed this year; its performance is superior to all other canes in the same locations.

Yields from a crop planted in the spring of 1956 and harvested in the drought year of 1957 were:

Variety	*Tons Cane per acre*	*Tons Sugar per acre*
53.S.47	16.07	2.27
Q.47	12.06	1.64

The first ratoon crop in 1958 yielded:

Variety	*Tons Cane per acre*	*Tons Sugar per acre*
53.S.47	54.35	8.19
Q.47	40.77	6.58

Frost resistance recorded in 1960 compared very favourably with N.Co.310 and was superior to most of the other commercial varieties. This condition has again been recorded following this year's frosts which badly damaged some of the commercial varieties.

In three observation trials established in 1959, its performance has been better than N.Co.310, Q.50 and Q.61 on red volcanic loam and grey forest loam in both the plant and ratoon crops. In one observation trial established in 1959 on the black Maroondan soils, it was better than N.Co.310 in the plant crop, but slightly worse in the first ratoon.

Fig. 45—The new Bundaberg seedling 53 S. 47 on right of picture is a vigorous cane and is showing good promise under droughty conditions. Compare with Q. 50 on left.

—photo N. McD. Smith.

Lack of arrowing, an apparent resistance to scale insect attack and the ability to remain erect in two current standover trials indicate its possible value for standover purposes.

Limited recent c.c.s. determinations indicate a mid-season maturity and,

because of non-arrowing habits and apparent resistance to stem rots, it should be a suitable variety for mid to late season harvest.

Summarising its agricultural qualities: germination, ratooning, row and interspace cover are good; yields of cane were better than the standard varieties in trials in dry and good years; c.c.s. is in the mid-season bracket; arrowing has not been observed, and ability to produce a standover crop appears to be good.

New Look in Implement Sheds

The introduction of tall mechanical harvesters to the sugar industry is bringing about a change in design of implement sheds. Few existing ones will accommodate the larger makes of mechanical harvesters and many farmers are now building high-roofed sheds to accommodate them. A few farmers, faced with the construction of new sheds to house their other machinery, have incorporated in their design a high-roofed section for the mechanical harvester. Such a type is the new implement shed built recently by Messrs. Amadio Brothers of Highleigh. This spacious shed, shown in the accompanying picture, provides for the mechanical harvester on the right hand end and the remainder of it should give adequate protection from the weather to their other implements for many years to come.

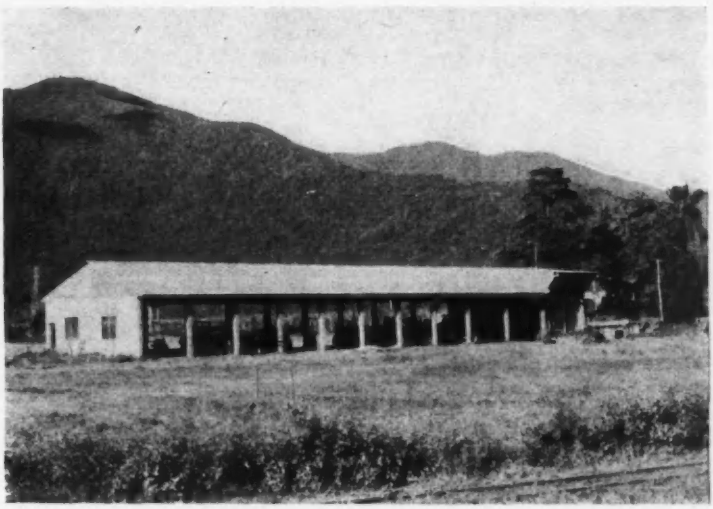

Fig. 46—A new shed at Highleigh showing the very high section at one end to house a cane harvester.

Farm machinery is expensive and, in North Queensland, the weather is one of its worst enemies. Corrosion costs money and it pays well to keep implements clean and under cover.

J.H.B.

Reward for Quality—Some Comparisions from Mackay District

BY C. G. STORY

In agriculture it is desirable that there should be some reward for quality. The sugar industry appreciated this as far back as World War I and a provision of the Cane Prices Acts of 1915 was that payment for cane should be made according to its quality. As is well known, this latter is determined by application of the c.c.s. formula and payment on this basis has been generally adopted since 1918.

Profit in Relation to c.c.s—Mackay District.

High mill average c.c.s. figures were obtained in the central area during the 1960 harvest. Two mills averaged over 16 c.c.s. for the season. Many individual canegrowers obtained excellent c.c.s. figures for the season and, of these, a number were well above mill average. Good results were obtained from the newer varieties, which gave high average c.c.s. figures for large tonnages, for example 1000 tons of Q.63 on one property averaged 18 c.c.s. The canegrowers reward for quality is shown in the following data set out in Table I—

TABLE 1

COMPARISONS WITH 1000 TONS AT 16 C.C.S.

A	B	C	D	E	F	G	H	I
c.c.s.	Value per ton (Sugar = £51 per ton)	Gross Value 1000 tons	Difference (£) from 1000 tons at 16 c.c.s.	Equivalent Tons Cane	Equivalent Acres at 30.5 t.p.a. Mill Av. 1959	Equivalent Acres at 24.6 t.p.a. Mill Av. 1960	Harvest cost at 16/3d. per ton	Difference in harvest cost from 1000 tons cane
13	85/11d.	£4296	£1379 (Loss)	1321	43.3	53.7	£1073	£260 (Loss)
14	95/2d.	£4758	£917 (Loss)	1193	39.1	48.5	£969	£156 (Loss)
15	104/4d.	£5217	£458 (Loss)	1088	35.7	44.2	£884	£71 (Loss)
16	113/6d.	£5675	—	1000	32.8	40.6	£813	—
17	122/8d.	£6134	£458 (Gain)	925	30.3	37.6	£751	£62 (Gain)
18	131/10d.	£6592	£917 (Gain)	861	28.2	35.0	£699	£114 (Gain)

Explanation of Figures in Table 1:

Column A—C.c.s. figures ranging from 13 to 18.

Column B—The 1960 value for one ton of cane at the particular c.c.s. shown in Column A with sugar at £51 per ton.

Column C—The gross value of 1,000 tons of cane at c.c.s. values ranging from 13 to 18.

Column D—This is the gross monetary difference between 1,000 tons of cane at 16 c.c.s. and 1,000 tons of cane at the other c.c.s. values. There is a loss from 13 to 15 c.c.s. and a gain from 17 and 18 c.c.s.

Column E—The equivalent tonnage of cane at 13, 14, 15, 17 or 18 c.c.s. which gives the same monetary return as 1,000 tons of cane at 16 c.c.s. The latter is the standard unit used for comparison purposes in this article.

Column F—This is based on the 1959 average tonnage of 30.5 tons cane per acre for one Mackay Mill area. The figures quoted are the acreages necessary to produce the tonnages in Column E. These tonnages with the c.c.s. values shown opposite in Column A would yield a gross monetary return equal to 1,000 tons at 16 c.c.s.

Column G—This is based on the 1960 average tonnage of 24.6 tons cane per acre from the same mill area. It is interpreted in a similar manner to Column F. Both Columns F and G allow a comparison to be made between two farms with different individual yeilding capacities.

Column H—The harvest costs for the tonnages of cane shown in Column E. A harvesting cost of 16/3d. per ton was allowed as per 1960 harvest.

Column I—This is the difference in harvesting costs compared with 1,000 tons of cane.

Other farm costs have not been considered. These would be relative to each particular property depending on its system of farming.

A further point evident from the data is the value of intensive production using the higher c.c.s. varieties.

High c.c.s. not Limited to the Larger Farms.

That smaller producers are not penalised by the size of their property in obtaining good quality cane is evident from Table 2 which covers three seasons (1956-1958) at one mill area.

Comparison of c.c.s. Values of District Varieties.

The Central area approved variety lists have received valuable additions since 1955, mainly varieties produced at the Mackay Experiment Station. Most varieties will produce good c.c.s.

TABLE 2

AVERAGE C.C.S. FROM GROUPS OF GROWERS WITH SMALLEST AND LARGEST PEAKS.

10 smallest peaks	14.614	10 largest	14.199
20 smallest including above 10	14.410	20 largest including above 10 ..	14.265
30 smallest including above 20	14.375	30 largest including above 20 ..	14.267

Mill average c.c.s. 14.36.

TABLE 3*

FORTNIGHTLY C.C.S. FIGURES AT PROSERPINE, 1958 SEASON.

Fortnight ending	Variety					
	Q.50	Q.58	N.Co.310	Pindar	Q.63	Trojan
28/ 6/58	11.09	11.73	12.23	11.23	12.47	
12/ 7/58	11.67	12.21	12.74	11.62	13.23	
26/ 7/58	12.22	12.54	13.30	12.20	13.05	10.16
9/ 8/58	13.27	13.23	13.91	13.15	14.39	12.10
23/ 8/58	13.47	13.25	14.20	14.99	14.60	13.76
6/ 9/58	13.57	14.05	15.27	14.60	15.17	12.70
20/ 9/58	14.51	15.14	15.73	15.00	16.50	14.53
4/10/58	15.32	15.77	15.97	15.70	16.48	15.54
18/10/58	15.86	15.72	16.10	16.14	16.54	15.09
1/11/58	15.32	16.09	16.68	15.34	16.84	15.54
15/11/58	15.47	15.53	15.28	15.74	16.50	15.60
End of Season December	14.60	14.32	15.03	14.70	15.46	14.73
Percentage of harvest	61	17	4	6	1	2

*Mill Average for Season 14.15. Percentage of harvest for each variety is based on total crop for season. There were no rainfall effects during the 1958 harvest.

TABLE 4*

FORTNIGHTLY C.C.S. FIGURES AT PROSERPINE, 1959 SEASON.

Fortnight ending	Variety							
	Q.50	Q.57	Q.58	Q.63	Q.68	N.Co.310	Pindar	Trojan
11/ 7/59	12.5	12.7	12,7	12.7	13.5	13.8	12.9	11.0
25/ 7/59	13.0	13.1	13.4	14.3	14.6	14.5	13.1	11.8
9/ 8/59	13.7	13.9	14.0	15.3	14.8	15.3	14.1	12.4
23/ 8/59	14.1	14.0	14.4	15.4	15.1	15.5	14.3	12.9
5/ 9/59	14.2	13.9	14.7	15.1	14.8	15.4	14.4	13.1
19/ 9/59	14.5	14.2	15.0	15.7	15.3	15.7	14.8	13.6
3/10/59	14.7	15.2	15.3	16.4	15.6	15.9	14.7	14.1
17/10/59	15.0	15.2	15.2	16.8	15.5	15.6	16.0	15.1
31/10/59	14.6	14.8	15.3	16.9	15.8	16.1	16.1	15.3
14/11/59	14.0	14.7	14.9	16.6	15.6	16.7	15.6	14.8
21/11/59	13.4	13.0	14.2	15.7	15.1	16.5	13.7	13.7
Average for Season	13.9	14.0	14.4	15.9	15.0	15.5	14.5	13.4
Percentage of harvest	49	2	23	5	4	6	4.5	2

*Mill Average for Season 14.44. Percentage of harvest for each variety is based on total crop for season.

figures in a year climatically suitable for high sugar but the real test of a variety is its ability to produce good sugar under less ideal conditions.

Tables 3 and 4 compare the newer varieties with older well established varieties at Proserpine mill for both the 1958 and 1959 harvests. Figures are the average c.c.s. of the varieties under review for progressive fortnightly periods throughout the season.

The drop in c.c.s. for Q.63 shown for the period ending 21st November, 1959 was due to the fact that quite an amount of Q.63 standover was included in crushing for this week. Rain during the 1959 season at Proserpine caused a loss of 56½ hours' crushing time. The mill started crushing on the 1st July, 1959, and crushed for twenty weeks whereas the seven other district mills had crushing periods from 15.3 to 17.9 weeks. This resulted in a lower average c.c.s. The other mills were 0.5 to 1.0 unit better for seasonal average c.c.s. These factors need to be taken into account when studying the figures for 1959.

New Cultures for Green Manure Seed

For many years the Bureau has issued free to canegrowers a culture with which to treat green manure seeds before planting. These cultures were available for Poona peas, Reeves' Selection, Cristaudo peas, velvet beans any many other types. The purpose of the culture is to inoculate the seed with the correct bacteria to ensure that the resulting plants can utilise atmospheric nitrogen.

From now on the well-known culture in a glass bottle will be replaced by a dark-brown powder in a packet. The powder is peat, which is impregnated with the bacteria, and which is just as effective as the previous preparation in the bottle. If kept in a refrigerator the new product will retain its efficacy longer. **All canegrowers who do not use the inoculum immediately it is received should place the packet in the refrigerator—but not in the freezing chamber.** It will not contaminate food.

Please read the instructions for use which are enclosed in each packet.

Performances of Q.70 and Co.475 in the Innisfail Area

BY I. T. FRESHWATER

There are large tracts of land in the Innisfail district which are rated second class, so far as cane growing is concerned. On farms in these areas Pindar has been the mainstay of production for some years but, due to the risk of breakage by high winds and also its unreliable early c.c.s. performance in recent years, new part-replacement varieties are being sought keenly. However, Pindar possesses other such excellent agricultural characteristics that it will no doubt be grown in a big way for years to come. Two varieties which have shown promise on the poor lands of the Innisfail area are Co.475 and Q.70.

Fig. 47—An excellent crop of Co. 475 in the Mourilyan area on sandy soil.
photo C. G. Hughes.

Co.475 was planted on farms in the area in 1958. Commonly called the "Indian runner" locally (it was bred in India), it impressed all by its vigorous growth and ability to produce a reasonable crop under adverse soil and weather conditions. It was replanted in 1959, extensively so in 1960, and placed on the Mourilyan and Goondi approved variety lists for 1961.

The variety is not suited to any but the poor soils. On better land it will lodge and, because of the length and number of thin stalks, becomes almost unharvestable.

Its c.c.s. performance has been reasonable. While not outstanding, it has been better than Pindar which, as mentioned previously, is the major variety for the particular soil type on which Co.475 will be grown.

Q.70, bred at the Bundaberg Sugar Experiment Station, is the first southern variety since Q.50 to show

any promise in the Innisfail district. However, whereas in Bundaberg it is grown on alluvial and irrigated land successfully, in Innisfail it lodges badly on the better class of soil and has performed best on the poorer, drier areas. Q.70 was also planted on farms in 1958, after an initial planting in the Mourilyan sub-station the previous year had showed promise. It has been propagated widely since then and has proved popular with farmers who have grown it. A very reliable germinator and ratooner, it possesses good cover and is a shy arrower. Its susceptibility to drought in the drier areas of Queensland should not prove a problem in Innisfail, with an annual average rainfall of 143 inches.

A study of the c.c.s. of the variety has shown that, early in the season, the results are only average. However, mid-season and late sugar content has been good and it is hoped further observations this year will confirm those of the previous two years. If the to-date figures of its c.c.s. performance are confirmed, then it is anticipated that it will be released for general planting in the Mourilyan and Goondi areas in 1962.

Both the above varieties are also being propagated in the South Johnstone and Tully mill areas, but on present indications the amount of land suitable for their growth in those areas is very limited.

Fig. 48—Q. 70 growing on Mourilyan sand country in July, 1961.
photo I. T. Freshwater.

CORRECTION

A typographical error occurred on the last page of the July issue of the Quarterly Bulletin. In the figures given for the 1960 cane crop the tons of cane for New Guinea varieties should read 421,414 and not 42,414, as printed.

FREE SERVICES TO CANE GROWERS

The Bureau offers the following free services to *all* cane growers in Queensland:—

Soil Analysis and Fertilizer Recommendations

Your soil will be analysed by the most modern methods, and a report will be posted containing a recommendation covering the type of fertilizer required, the amount per acre, the need for lime, and other relevant information. Phone the nearest Bureau office and the soil samples will be taken as soon as possible.

Culture for Green Manure Seed

Cultures and instructions for the inoculation of the seed of cowpeas or velvet beans will be posted to any cane grower upon request to The Director, Bureau of Sugar Experiment Stations, 99 Gregory Terrace, Brisbane.

We are now supplying a new form of culture which is easier to use and which is just as effective. But this is IMPORTANT—KEEP THE PACKET IN THE REFRIGERATOR UNTIL IT IS REQUIRED.

If kept refrigerated the culture is good for twelve months.

When applying for culture, state the variety of seed to be planted and the number of bushels.

Advice on All Phases of Cane Growing

The Bureau staff is at the service of all cane growers. They can best advise you on matters pertaining to varieties, fertilizers, diseases, pests, drainage and cultural methods. Bureau officers are available in every major cane growing district. A phone call will ensure a visit to your farm.


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